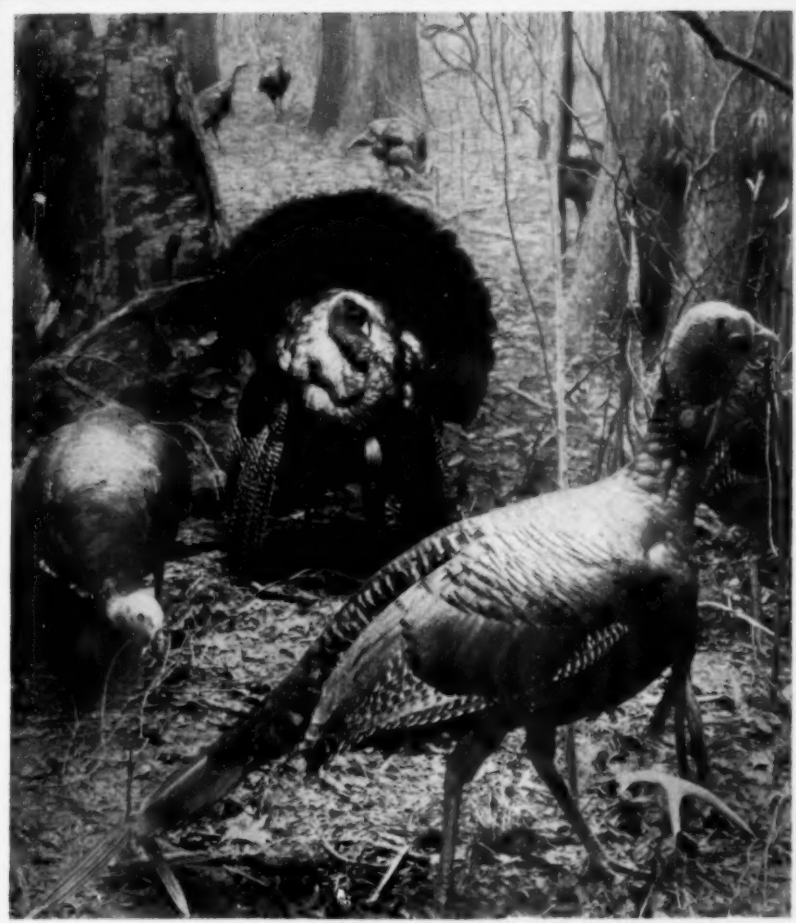


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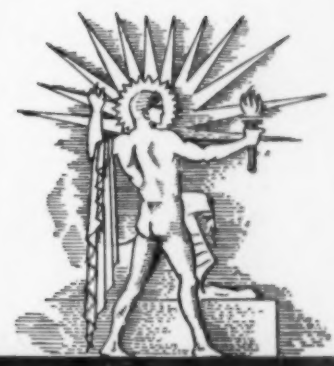
SCIENCE NEWS LETTER

NOV 20 1931

THE WEEKLY SUMMARY OF CURRENT SCIENCE.



Field Museum of Natural History



NOVEMBER 21, 1931

Pilgrims Not the First to Know Them

See Page 335

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SCIENCE SERVICE PUBLICATION

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VOL. XX

No. 554

The Weekly
Summary of  Current
Science

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The Institution for the Popularization of Science organized under the auspices of the National Academy of Sciences, the National Research Council and the American Association for the Advancement of Science.

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DO YOU KNOW THAT

?

X-ray pictures show that the heart of the Finnish sprinter Paavo Nurmi is three times the average size.

The riflebird is so called because its cry resembles the whizzing and striking of a bullet.

Recent tests show that one cause of leather book bindings' becoming rotten is the gases in the smoke from factories and locomotives.

There are only twelve letters in the Hawaiian language,—all the vowels and the consonants H, K, L, M, N, P, and W.

Young women 18 and 19 years old are the age group most subject to accidents in industrial work, according to a recent survey in New York.

The ears of the long-eared bat are almost as long as the combined length of its head and body, and may be curled forward and downward while the little animal sleeps.

The cashew "nut" is not really a nut, but is the seed of a fleshy fruit which grows on an evergreen tropical tree.

Dahlias were first imported into the United States with the idea of using the roots for food.

There is some evidence to indicate that the Roman mile was an invention borrowed from the Greeks.

It has been pointed out that bottles left in the woods by picnic parties may start forest fires if the sun's rays are concentrated by the curved glass.

Although jade is commonly thought of as being green or white, there is also black jade, and jade of greenish-yellow and sky blue.

The London Chamber of Commerce advocates uniform air markers for towns, the sign to be of white letters on black ground, letters to be 20 feet high and 16 feet wide and accompanied by an arrow pointing north.

WITH THE SCIENCES THIS WEEK

ARCHAEOLOGY		MYCOLOGY	
Pueblo Apartments	329	Fungi on Car Bodies	329
Tools of Rock Crystal	324	PHYSICS	
ASTRONOMY		Rainbow Feather Colors	328
Conjunction of Planets	333	Tapping Matter's Internal Energy	323
Testing Telescope Mirror	329	PHYSIOLOGY	
CHEMISTRY		Another Sex Difference	325
Nobel Award to Germans	325	Sensory Reactions Differ	333
CHILD STUDY		Two-Way Nerves	329
Movies of Great Service	325	PLANT PATHOLOGY	
ENGINEERING		New Elm Tree Disease	328
Airplanes Spot Line Failures	334	PLANT PHYSIOLOGY	
Graphs for Highway Design	328	When to Tap Chicle Trees	334
Research to Save Railroads	332	PSYCHOLOGY	
ENTOMOLOGY		Direction in Reading	326
Insects Active Until Frost	323	Shocked Rats	328
FORESTRY		SEISMOLOGY	
Home for Research	324	Earthquakes—"A Classic of Science"	330
GENERAL SCIENCE		ZOOLOGY	
Book Reviews	336	Ostracized Bruin	332
MEDICINE		Tennessee's Wild Boars	332
Adrenal Gland Operation	332	Turkey—"Nature Ramblings"	335
Counteracting Sunburn	329		
Cruiser for Cancer	328		
Mosquitoes on Airplanes	324		
Poliomyelitis Selects Victims	334		

Science Service presents over the radio, an address

HEREDITY AND DISEASE

By Dr. C. B. Davenport, director of the Station for Experimental Evolution of the Carnegie Institution of Washington.

Friday, November 27, at 3:45 P. M., Eastern Standard Time

Over Stations of

The Columbia Broadcasting System

PHYSICS

Artificial Gamma Radiation Approximates Cosmic Rays

New Simple Apparatus, Using old Cat-Stroking Principle, Expected to Generate Potential of 20,000,000 Volts

WITH production in Germany of artificial gamma rays of intensities that approach those of the mysterious cosmic rays, and with twenty million volts promised by a Princeton physicist's new apparatus, Prof. Arthur H. Compton, Nobel prizeman, foresees the possibility that man may be able eventually to tap the internal energy of matter and put it to work. A new idea of how the energy stores of our brilliantly radiating sun are supplied was also advanced by the University of Chicago professor, at a conference sponsored by the American Institute of Physics at New York.

An experiment by Dr. Walter Bothe, German physicist, was heralded by Prof. Compton as "remarkable" and as accomplishing what has long been "considered an impossibility." On his recent trip to Europe, Prof. Compton learned that Dr. Bothe has been able to produce artificial gamma rays by bombarding beryllium metal with alpha rays. These artificial gamma rays are an approach to artificial cosmic rays. They are the same kind of radiation as light and X-rays, except that they are much more penetrating. The beryllium metal from which they were obtained is the lightest metal that can be used practically, and the alpha rays that were used by Dr. Bothe in the bombardment are speeding hearts of helium atoms given off when radium and other elements disintegrate radioactively.

Amazing Result

The amazing result of Dr. Bothe's experiment, as explained by Dr. Compton, is that there is obtained from the bombardment of beryllium, through the giving off of the artificial super-gamma ray, much more energy than was supplied by the attacking helium atom heart. This is interpreted to mean that what happens is not the disintegration of the beryllium but an actual process of synthesis in which a heavier element, carbon, is formed and energy is liberated in the form of the artificial "soft" cosmic rays.

If that is so, the hope of obtaining

energy from such artificial synthesis is due for a revival. There is hope also that one element can be changed into another and that the age-long wish for transmutation may be fulfilled.

The practical application of this possible new energy source is made difficult by the fact that only one in fifty thousand of the projectiles hurled at the beryllium hits its mark and the process is therefore dreadfully inefficient. Although there may be places in the universe where the synthesis proceeds at a much faster rate, the physicists are frankly not optimistic about making this energy source competitive with coal, oil and water power.

But conditions in the sun may be different, and the theory is advanced that solar energy that warms and lights our earth may be the result of synthesis in the sun rather than the present favorite theory of the conversion of matter into radiant energy. This idea carried to its logical conclusions may greatly affect all ideas of how the solar system and our earth originated.

In testing these latest physical theories and providing more powerful electrical tools, a new electrical generator developed at Princeton University by Dr. Robert J. Van de Graaff, now of the Massachusetts Institute of Technology, will be useful. A large generator to be built in an airship hangar near New Bedford, Mass., is expected to produce ten to twenty million volts. A model built at Princeton gave one and one-half million volt sparks that jumped three feet.

Simplicity marks this new method of producing previously unattainable direct current voltage. It operates on the ancient principle of static electricity, that is utilized when you obtain sparks from a cat's back or scrape your feet across a rug and then touch metal. In the large generator the operator will sit inside one of two fifteen-foot-diameter electricity-collecting spheres, and, although he will be charged with from five to ten million volts, they will not harm him because he will not be grounded.

Prof. Compton, as the result of his

survey of present knowledge of the atomic nucleus, believes that "we may have to find some fundamental principles of the physical world which are as yet unknown" before the nucleus can be understood. He recalled that the Danish physicist, Prof. Neils Bohr, has suggested that perhaps the principle of the conservation of energy, long considered the foundation rock of modern science, is not obeyed when electrons are ejected from atoms.

Science News Letter, November 21, 1931

ENTOMOLOGY

Insects Active on Many Battlefronts Until Frost

DAMAGE to man's crops and trees, inflicted by enemies that never let up so long as they can crawl, is reported from a score of battlefronts in this country by the Bureau of Entomology of the U. S. Department of Agriculture. Until frost stills them, and even after frostfall, in greenhouses and other sheltered places, the war against giant man waged by swarming insects goes on unabated.

The fall armyworm is a foe that can be depended on to crop up somewhere every year. Its latest depredations, according to the Bureau of Entomology report, have been in the sugarcane and soybean fields of Louisiana, and in Michigan greenhouses. Another destructive caterpillar was the cabbage web-



DR. ROBERT J. VAN DE GRAAFF
Former National Research Council fellow, with the model of his high voltage generator.

worm, active on both Atlantic and Pacific seaboard.

The huge apple crop was made the objective of a mass attack of apple leafhoppers, all the way from New England south to Virginia and west to Illinois and Kentucky. These insects, in addition to specking the fruit, were a very decided nuisance to the pickers. Two troublesome invaders of shade trees were the birch skeletonizer and the boxelder bug. The latter is reported as very prevalent in both eastern seaboard and far western states.

Among the grain insects, the chinch bug is reported as going into hibernation in distinctly alarming numbers, in the east central states. Corn earworm persisted extremely late in the northern

grain area. It not only damaged late sweet corn but also ate the mature field corn and did very considerable damage by entering greenhouses, where the larvae attacked practically all forcing plants.

One grain pest, however, was at least partially circumvented. In the eastern states, there was an unusually heavy emergence of the Hessian fly in September. In most places, this was too early to infest wheat sown after the fly-free date. The insects, having no thick-growing grain fields to which they could resort, turned to the scanty scatterings of volunteer wheat, and infested the stalks heavily.

Science News Letter, November 21, 1931

MEDICINE

Disease-Bearing Mosquitoes Able to Ride on Airplanes

PLANES from the tropics will probably carry on their sides, along with the fire extinguishers, spray guns for killing insects. This innovation is to be expected as a result of studies of mosquito transportation by airplanes, announced by the U. S. Public Health Service.

Because a certain type of mosquito carries the virus of yellow fever, which still occurs in parts of South America, the Public Health Service investigated the possibility of these insects getting a free plane ride into the United States and bringing the disease with them.

Certain types of airplanes do carry mosquitoes, Dr. T. H. D. Griffiths and J. J. Griffiths of the U. S. Public Health Service found. These investigators put stained mosquitoes on planes leaving San Juan, Porto Rico, and recovered a certain number when the plane reached Miami, 1,250 miles away, that same day.

"With conditions at airports such as would permit of many mosquitoes getting aboard, it might be expected that approximately one-fifth of the original number would be transported for a long distance—at least 1,250 miles—in one day with repeated landing and opening of doors, hatches and windows, and refueling, unloading and loading taking place," they reported.

Under normal average conditions about airports, heavy infestation of air-

planes would not be likely, but even one infected or infective mosquito of the yellow fever type might be the means of starting an epidemic.

However, considering the small number carried by aircraft and the facility with which planes may be freed from mosquitoes, they concluded that while the danger exists, airplanes can be efficiently treated so as to destroy mosquitoes and thus to avoid retardation of air traffic progress.

Science News Letter, November 21, 1931

ARCHAEOLOGY

Stone Age Men Made Tools of Rock Crystal

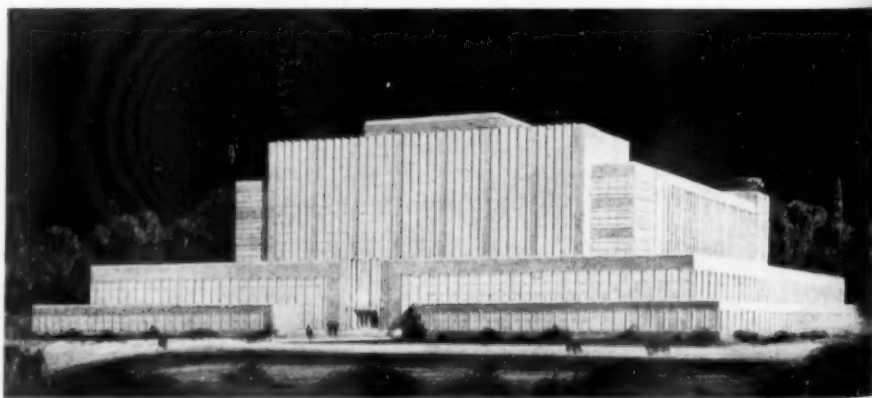
ROCK CRYSTAL, now used as a semi-precious stone, took the place of high-grade steel with the men of the Old Stone Age. They did not make many of their tools and weapons of it, but they apparently valued it and used it when they could.

At the meeting of the National Academy of Sciences at New Haven, Conn., Prof. George Grant MacCurdy of the Peabody Museum, Yale University, told of seven rock-crystal tools all found at the same level in one cave in France, by the expedition of the American School of Prehistoric Research. The tools were of the type known as Mousterian, used by Neanderthal man at one stage of his development.

The rock-crystal tools found by Prof. MacCurdy's associates are among the oldest of their kind, for Neanderthal man was the earliest race to make implements from this material. Though there are older Stone Age tools in plenty, their makers, whoever they were, were not masters of the art of working the hard and obdurate rock crystal, and contented themselves with flint and other "plain" stones.

Early California Mammals

That fossils of very early mammals have been found in California, extending the knowledge scientists have gained of the appearance and development of life on this planet, was reported to the



HOME FOR RESEARCH

A multitude of scientific researches on the many different kinds of wood will be housed in this unique building. Contained there also will be a permanent exhibition of the beauty of hardwoods used in interior finishing. The building is the new U. S. Forests Products Laboratory at Madison, Wis., drawn by the architect as it will appear when completed next summer. Although this headquarters of research is being erected for utilitarian purposes, it is planned to install wall panels and finish flooring of different woods in different rooms to display effectively the beauty and usefulness of many American forest species.

CHEMISTRY

Nobel Chemistry Award To German Industrial Leaders



DR. FRIEDRICH C. R. BERGIUS
To whom, with Dr. Carl Bosch, the 1931 Nobel Prize in chemistry was awarded.

THE Swedish Academy of Science has announced the award of the 1931 Nobel Prize in Chemistry to Dr. Friedrich C. R. Bergius and Dr. Carl Bosch of Heidelberg, for their outstanding achievements in industrial synthetic chemistry.

The German winners of the prize in chemistry are two of the world's foremost practitioners of the magic of industrial science. Dr. Bergius has for many years performed marvels in the transformation of coal, changing it into motor fuel, lubricating oils, methanol (formerly known as "wood" alcohol) and other substances. He had developed a scientific theory on the things that must have happened to the plants of long ago to turn them into coal; and his latest feat has been to indicate the possibility of making sugar out of wood on an industrial scale for the manufacture of alcohol. A firm for the commercial exploitation of this process is already in existence.

Dr. Bosch, sharer of the prize, and head of the huge German chemical manufacturing firm, the I. G. Farbenindustrie, has specialized in the building up of cheap nitrogen into more valuable

products, as his associate has worked on the building up of cheap carbon. Dr. Bosch's great achievement has been the perfection of a practical method for catching nitrogen from the air so that it can be combined with hydrogen to make ammonia by the Haber process. This in turn is used in the manufacture of fertilizers. Thanks to this process, blockaded Germany literally lived on air to a considerable extent during the war, and even captured from the atmosphere an indispensable ingredient for smokeless powder, TNT and other explosives.

Dr. Bergius was born in 1884 near Breslau, and studied at the Universities of Breslau, Leipzig and Berlin and the Technical University of Karlsruhe. Dr. Bosch was born in 1874 in Cologne, and studied at Cologne, Charlottenburg and Leipzig.

Science News Letter, November 21, 1931

CHILD STUDY

Movies of Great Service In Study of Children

THE VALUE of motion pictures in the systematic study of development in young children was explained to the meeting of the National Academy of Sciences by Dr. Arnold Gesell, director of the Yale Clinic of Child Development.

For five years research members of the staff of the clinic have been gathering motion picture records of infants in the first year of life. Normal infants were used as the stars of the pictures, and the same child was photographed repeatedly at four-week intervals from the tender age of four weeks until it was a year and four weeks old. The scenes were all set in a specially designed crib, and the continuity was arranged to bring out changes in posture, methods of locomotion, skill in manipulation and other phases of development.

A special reel was shown by Dr. Gesell in which two films were projected simultaneously, one of an infant about six months old, the other showing the selfsame child four weeks later doing exactly the same things.

Science News Letter, November 21, 1931

PHYSIOLOGY

Sex Differences in Oxygen Need for Tissues Discovered

ONE MORE difference between the sexes has just been found by science. This is a difference in the oxygen demands of the tissues, and was reported to the meeting of the National Academy of Sciences by Dr. Oscar Riddle of the Carnegie Institution of Washington.

In investigations on ring doves and pigeons, Dr. Riddle found that hemoglobin and red blood cells exist in different quantities in the blood of the two sexes, the males having a larger quantity of these oxygen carriers of the blood. The quantities of these cells also vary with changes in seasons, as does the basal heat production of these ani-

mals. The changes in quantity of hemoglobin and red blood cells correspond closely with the seasonal changes in heat production.

"The oxygen carriers of the blood fluctuate with the oxygen demands of the tissues, and their sex difference reflects unequal oxygen demands of male and female tissues," Dr. Riddle concluded.

These oxygen carriers therefore seem to reflect primary sex difference and to contribute further evidence to the theory that energy changes in the female go on more slowly and in more acid medium than in the male.

Science News Letter, November 21, 1931

PSYCHOLOGY

Why Read From Left to Right?

Tests Given Children Indicate the More Natural Method Is to Begin at the Right Side as in Oriental Languages

By Marjorie Van de Water

WOULD you be able to read this page more easily if it were printed from right to left, or from the top of the page to the bottom—provided of course that you had learned to read in this manner?

In localities where only English is in general use, this may seem like an absurd question, but not all languages use the left-to-right direction of printing. In Honolulu, for example, several languages are spoken and read—and they go in contrary directions. There the question of which direction is more natural is a practical one, and the answer has been sought by Madorah E. Smith of the Territorial Normal School in that city.

When you learned to read English, you formed the habit of reading from the top left corner of the page across to the right, skipping abruptly back to the left to go across the second line, and so on to the bottom only to make another abrupt jump to the top of the next page. You have learned this method so well that it has become automatic with you. You read this way with great ease. So that even when a photograph is described it is "from left to right."

The person who has read only Hebrew, on the contrary, would find it very awkward. For his language is printed from right to left and he has become thoroughly used to that "backward" system.

Those who read ancient Latin followed still another method—they read from left to right on one line and then back from right to left on the next. This method was called "ox-track" writing, because it is like the way the oxen worked back and forth across the field when they pulled a plow.

Here is how a familiar rhyme might look printed in the ancient Latin style:

Twinkle, twinkle little star
era uoy tahw rednow I woH
Up above the world so high
.yks cht ni dnomaid a ekiL

Could you read it? Was it easy? Well, perhaps you didn't need to read it—maybe you remembered it. All right then—see whether

ezingocer uoy naC .ysae sa si siht
?tuo ti lleps uoy od ro, drow eht

Perhaps you would prefer the Chinese method as in the paragraph which follows. Or is it "all Greek"? Try it.

t	d	p	r	a	C
h	o	a	i	t	h
e	w	g	g		i
	n	e	h	t	n
l			t	h	e
e	a			e	s
f	n	r	o		e
t	d	e	f	t	
		a		o	b
	t	d	t	p	e
	o	i	h	g	
		n	e	a	i
		g		n	n
				d	s

The method of running letters down a column is followed to some extent in advertising. Just how much the advertiser sacrifices in legibility for the sake of the novelty of the presentation is one of the facts that may be disclosed as a result of this recent study in the ease of different methods of reading.

If you have found these samples puzzling, imagine the bewilderment of the little six-year-old child in Honolulu who starts to school and immediately is faced with the problem of trying to learn to read two languages—one beginning at the left top of the page and going east, and the other starting at the top right and going south. Naturally the results are chaotic in both languages.

Miss Smith was anxious to find out how these youngsters would prefer to read if they were not forced by necessity to follow the arbitrary conventions of their elders. In a recent report to the Hawaiian Academy of Science, she described tests which she made to uncover the natural inclination of children before attending school and also after they had had instruction in either

Oriental language or English or both. Altogether 740 children from two to nine years of age were tested, and also 112 adults.

The test consisted of "reading" a page of pictures arranged in five rows of five pictures each. The pictures were of objects which would be thoroughly familiar to even the youngest children. They included, for instance, a ball, an apple, a shoe, and a cat. The page was laid down squarely in front of the person tested with no hint of where to begin. They were just told, "Let's see if you can tell what these pictures are."

As the pictures were pointed out and named, a record was kept of the order in which they were "read." The youngest children followed a haphazard scheme, or rather lack of scheme, apparently beginning with the picture which interested them most. There was, however, a slight tendency for them to begin with a picture nearer the right margin than the left and also to start in the lower part of the page.

Apparently children have to be taught



JABBERWOCKY

And the mouse talks outwards
All mimes were the porcupines,
Did dare and dangle in the ropes:
Twas brillig, and the slithy toves

OX-TRACK AND JABBERWOCKY

The ancient Latin inscription, at the top, is written in what was called "ox-track writing" because it goes back and forth across the page as oxen traveled in plowing. Jabberwocky, below, the book which Alice discovered in *Through the Looking-Glass*, was written like the reversed lines of the old Latin.

to start the page at the top. It is not a natural tendency.

Very young children do not follow any order at all in the pointing out of the pictures. Of the 25 two-year-olds tested, not one followed any clear pattern and only one showed traces of a pattern.

At the age of three, however, some children begin to follow a definite pattern. The plan sometimes follows that used in one of the Oriental or European languages, but often it is one of his own, not used in any written language. For example, 18 per cent. of the three-year-olds used a sort of spiral pattern—they would name the pictures in turn all around the edge of the paper and then travel toward the center.

Difficulty in Giving Tests

The proportion of children following a definite pattern increases steadily with age up to the age of six. That was when the children started to school, and many of them attended two schools—the native school where an Oriental language printed vertically was taught, and the American public school where they were taught to read English in a horizontal direction.

By the age of seven, the children attending only one school would use practically the same reading direction for the pictures as that used in the language they were learning, but those attending both schools failed to develop a definite pattern to the same extent.

Considerable difficulty was encountered in giving the test to adults for the rather amusing reason that it was too simple. It was necessary to explain carefully that there was no catch, and that it was not an intelligence test. The examiner's position was made particularly embarrassing because of the fact that the true purpose of the test could not be divulged until after the results had been obtained. A mere hint that the purpose was to test natural direction of reading would have served to make the subjects self-conscious and the direction followed would be unnatural as a consequence.

Yet it was surely difficult to present the group of simple pictures with a straight face and expect the person tested to solemnly point out which was the book, the doll, the toothbrush.

Finally it was possible to find 112 adults willing to carry through the test in seriousness. Of these, 50 read only English or languages written in a similar direction. Another 50 read both English and some Oriental language.

From the test results of these adults, it was indicated that the habit of reading in a certain direction is more fixed in the person who reads only languages travelling in one direction. Forty-one of those reading only English followed the same direction in reading the pictures; seven followed some other horizontal direction, and only two used a vertical direction.

On the other hand, of the 50 who read both Oriental and European languages only 19 named the pictures in the English direction. Ten used the back-and-forward method of ancient Latin. All the others used some vertical direction.

Miss Smith was anxious also to test adults who read only some Oriental language, but only ten were found who would submit to the test.

One of the ten Orientals read the test in the English direction, two followed the Hebrew direction from right to left horizontally, but the rest all preferred some vertical direction.

Two illiterates who were tested read, one in the Hebrew direction and one in inverted Old-Latin direction.

The results among both the English readers and the Orientals were probably affected by two factors—English-speaking people have a considerable amount of practice in reading up and down because nearly always figures are read in this manner. We add up a column, or down, or up one line of digits and down the next. On the other hand, the Oriental has practice in reading in the horizontal direction, because the comic strip in the Japanese paper is printed horizontally.

Beginning at Bottom

"The tendency of the youngest children to begin at the right would seem to show that the starting point of Oriental languages is more natural in that they too begin at the right hand," Miss Smith concludes. "But the children showed an even more marked tendency to begin at the bottom, which Oriental languages do not do. The preference of the children who could not read for the horizontal as opposed to the vertical direction may possibly indicate that that direction is the more natural; but they show frequently an order of their own, the spiral, and a preference for reversing direction on alternate lines as is found in ancient Latin."

The teachers in Honolulu are not the only ones who have to deal with the problem of the child who insists upon reading and writing in the wrong di-



DOUBLE "BACKWARDS"

A page from a Chinese primer, in which the reading matter starts at the upper right and goes down.

rection. Anyone who has had to teach many left-handed children, or children who have not become fixed in either left- or right-hand habits, has met with the youngster who persists in writing backwards in such a way that the result is decipherable only with the use of a mirror.

The tendency is known to scientists as "strephosymbolia" or twisted symbols. Mirror-writing is the natural method of writing with the left hand, because movements away from the center of the body are easier than those toward it. Persons with strephosymbolia find mirror-writing much easier than does the normal person, and quite often will write more easily in this manner than in the forward direction.

It is not merely a matter of the ease of writing from right to left that makes these individuals reverse their script. Many, in fact, do not learn to write at all, simply because it is so difficult for them to think of forms in the left-to-right direction. Errors in reading are made also. "Rat" is read as "tar," "era" as "are," "but" as "tub," "emit" as "time," "ton" as "not," "gum" as "mug," and so on. For such unfortunates only "reversible" words, like "winnow," "level" and "madam" are easily readable.

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Science News Letter, November 21, 1931

PHYSICS

Lovely Feather Colors Due Mainly to Reflection

THE RAINBOW colors of a pheasant's feathers are rainbow colors in fact, to a very considerable extent. That is, the hues are largely due to reflection from transparent substances in the feather, just as the rainbow is due to reflected light from transparent raindrops.

How pheasant feathers borrow their hues from the sun was discussed before the meeting of the National Academy of Sciences at New Haven, Conn., by Dr. Stanley C. Ball of the Peabody Museum, Yale University. He found that the iridescence of the feathers he studied was determined partly by the shape and position of the feather barbs, partly by the position of the light source, and partly by the position of the observer himself.

This does not mean that feathers have no colors of their own. There are plenty of pigment bodies in parts of the feathers, supplying a sort of ground-color; but the real "show" of a beautiful bird's plumage is mostly a matter of reflected light.

Science News Letter, November 21, 1931

MEDICINE

Price of Cruiser Asked For Cancer Research

"ONE CRUISER for cancer would insure the banishment of this plague."

This dramatic statement was made at the meeting of the American Chemical Society at Washington by Dr. Ellice McDonald of the Cancer Research Laboratories, Graduate School of Medicine, University of Pennsylvania.

Dr. McDonald expressed great hopefulness over the possibility of the ultimate discovery of a cure for cancer, but said that time and money are needed for this work.

Criticizing the demands of the Navy League for huge sums of money for cruisers, he pointed out that the price of one cruiser would finance the work of the cancer research institutes of the country for 100 years.

Cancer is taking a toll of 130,000 deaths a year, he said. About three-quarters of a million people in the United States suffer from cancer at the present time. The mortality from cancer has increased by more than half in twenty-

five years, and if the same rate continues, the number of women dying from cancer 60 years from now will be 192 per 100,000 instead of 117 per 100,000 as at present.

Dr. McDonald described the work in his laboratories where chemists, physicists, biologists and other scientists are united in the fight against cancer. These investigators have found that blood of persons suffering from cancer is more alkaline and contains more sugar than normal blood. They believe this blood sugar is different from normal blood sugar and that it is of the active or gamma type of sugar. Moreover, the cancer cell adapts this active sugar in a different way from normal, according to their theories.

Science News Letter, November 21, 1931

PSYCHOLOGY

Shocked Rats Show Individual Differences

MARKED individual differences exist among rats, it is indicated by the way in which they respond to a mild electric shock. But it is an easy matter to train all of them to scoot through a doorway when they receive shocks of 0.08 milliamperes, which is a current little more than barely perceptible to a human being. This new method of training rats was devised at the Johns Hopkins University psychological laboratory under the direction of Dr. Knight Dunlap, and a preliminary report of it will be published in a forthcoming issue of the *Journal of Comparative Psychology*. It is looked upon by Dr. Dunlap as offering an improved method for the study of the rat's mental processes.

At first the rats were greatly excited and plunged about the compartment in which the shock was given, escaping by accident into the other compartment. But after from 30 to 120 shocks the rats learned to bolt directly into the other compartment, and to turn around facing the door ready for a quick getaway as soon as they should receive the next shock.

When a current of only 0.04 milliamperes was used, however, some of the rats learned more quickly than did the rats trained on the stronger shock, but some did not learn at all, the lighter shock apparently not affecting them.

An attempt to find out why the rats differ in their susceptibility will be made this year by Miss Evelyn Gentry at the Johns Hopkins laboratory.

Science News Letter, November 21, 1931

IN SCIENCE

ENGINEERING

Graphs Take Guesswork From Highway Design

SHOULD a new highway be built? Ought the streets be widened to care for the increasing number of automobiles?

To answer these questions in California, engineers get out pencil, paper and charts and begin to calculate; for they have found a graphic method of determining highway expansion. One of the graphs which have taken guesswork out of designing a new highway system shows by means of a curve the relation between the number of cars per person and the road space required to handle them.

In a report to the American Society of Civil Engineers, William J. Fox, chief engineer for the Los Angeles county regional planning commission, explains that if the proportion of travel in a given direction is known, as well as the ultimate population of a community, then the graph serves as a very accurate means of designing the highways system in a manner consistent with natural demand.

Science News Letter, November 21, 1931

PLANT PATHOLOGY

New Disease of American Elm Trees Discovered

THE PROMISE, "Seek and ye shall find," has been unexpectedly fulfilled in a research problem conducted at the Ohio agricultural experiment station of Wooster, Ohio, by Curtis May. He was hunting for infections by the Dutch elm disease, which has caused some alarm among nurserymen and foresters in this country, and he found instead a brand-new, or at least hitherto unrecognized, native American disease of elm trees. Specimens of elms suspected to have the Dutch elm disease proved to have, in about ten per cent. of all cases, a fungus infection of a different type—which, however, was doing a good deal of mischief to the trees.

Science News Letter, November 21, 1931

SCIENCE FIELDS

MEDICINE

Long Light Waves Used In Treating Sunburn

A NEW method of treating severe sunburn has been tried by a Swiss physician, Dr. F. Bircher.

The method consists in exposing the patient to light rays of long wavelength. Dr. Bircher reported to the *Schweizerische Medizinische Wochenschrift*, Swiss medical journal.

He has tried it on only one patient so far, but the results were surprisingly favorable. The method is based on the fact that the effects of prolonged exposure to rays of short wavelength, especially ultraviolet rays, can be counteracted by rays of long wavelength. It is the short wavelength rays of sunlight that produce sunburn.

Science News Letter, November 21, 1931

ARCHAEOLOGY

Pueblo Apartments Found Within Arizona Caves

APARTMENTS within caves, inhabited as transient quarters by Pueblo Indians of the thirteenth century, have been found in Arizona by Neil M. Judd of the U. S. National Museum.

Mr. Judd set out for the San Carlos Indian Reservation, on which the caves are located, with the hope of finding cave dwellers even more ancient than Pueblos. Local rumors said that hunters had looked into these caves and had seen old baskets, which they described as remarkable. No archaeologist had ever probed into the recesses to read the story there. Perhaps the baskets were very old indeed, made and used by Basket Maker tribes, whose existence has been traced in other parts of the Southwest.

When he checked up on the rumors, Mr. Judd found that the baskets were only half a century old, for all their look of gray, broken antiquity. They are Apache baskets, Mr. Judd explains. From the Apache relics in the caves it appears that Apache Indians used the caves as storage places during the Apache uprising in the 1880's.

The Pueblos, who occupied the caves five hundred years before the Apaches, had built crude rooms inside the caves. With adobe and stone they made rough walls, leaving the cavern roof to serve as ceilings. Smoke from the camp fires still stains the ceilings. That the Pueblos did not set up permanent housekeeping in the cave homes is deduced from the absence of refuse heaps.

Mr. Judd sets the time of Pueblo occupancy as late thirteenth century because of the type of pottery which the people used. The fragments of dishes and jars are similar to those of Showlow, another Pueblo settlement which has been dated by the famous tree ring calendar evolved for southwestern archaeology.

Science News Letter, November 21, 1931

MYCOLOGY

Fungi Make U. S. Cars Unpopular in Philippines

AMERICAN automobiles are losing popularity in the Philippine Islands. They are attacked by the little thread-like feeding organs of fungi. These organisms cause decay in the wooden parts of autos, with the result that the doors begin to sag and the top starts rattling or gives way entirely.

Most automobiles in the Philippines are American made, using temperate-zone woods. European cars are few, but some of them, to circumvent the fungi, use tropical woods which are not susceptible to fungous decay.

Ravages of the fungi occur within the first or second year of the car's life. Replacing decayed timbers in car bodies has now become a sizeable Philippine industry.

Spores of the fungi, spread by the wind, fall on automobiles and germinate. Moisture necessary for the fungous growth gains entrance to the wood used in the car, usually at the joints. Assisted by hot weather and plenty of rainfall, the fungi grow rapidly. They send out cotton-like threads, secreting ferments, which spread throughout the wood tissues and destroy them.

Two remedies are suggested by C. J. Humphrey, mycologist of the Bureau of Science, Manila, in a report to the *Philippine Journal of Science*. Resistant Philippine woods could be shipped to the U. S. for the manufacture of cars destined for the tropics, or American woods could be treated with substances, such as creosote, to render them reasonably safe from decay.

Science News Letter, November 21, 1931

ASTRONOMY

All-American Telescope Now Undergoing Tests

THE BIGGEST telescope mirror ever to be made entirely in the United States, 69 inches from rim to rim of its concave face, is now undergoing its final tests at the factory of the J. W. Fecker Company at Pittsburgh. If it passes them successfully it will soon be on its way to Delaware, Ohio, to be mounted at the Perkins Observatory of Ohio Wesleyan University.

Supervising the tests are Director Harlan T. Stetson of the Perkins Observatory and officials of the U. S. Bureau of Standards and of the Dominion Astrophysical Observatory at Victoria.

The block of glass from which the mirror has been ground was cast and annealed some time ago at the U. S. Bureau of Standards, in Washington. The task was undertaken to ascertain whether it was possible successfully to produce large pieces of optical glass in this country. Previously the great center for this kind of highly technical manufacture was the famous St. Gobain works in northern France, overrun and wrecked during the war. It was at St. Gobain that the 100-inch mirror of the great Mt. Wilson telescope, still the greatest in the world, was cast.

Science News Letter, November 21, 1931

PHYSIOLOGY

Return Traffic Slow Along Two-Way Nerves

NERVES that carry traffic in both directions have been found in catfish by Prof. G. H. Parker and V. L. Paine of Harvard University. In this they are quite unlike the majority of nerves, which are strictly one-way affairs operating in pairs, one line to carry news to the brain and other centers, the other to bring back orders to the muscles and glands.

But the two Harvard zoologists, who reported their research before the National Academy of Sciences meeting at New Haven, Conn., found that the lateral line nerve of the catfish not only transmits sensory impulses in one direction but carries trophic or response impulses in the opposite. The returning impulses must find it hard going against the inbound traffic, however, for they travel slowly, approximately two centimeters, or less than an inch, in a day.

Science News Letter, November 21, 1931

SEISMOLOGY

Earthquakes

"A Classic of Science"

Confused Sounds and Rude Shaking Characterize Quakes Whose Spreading Waves Record on Distant Seismographs

EARTHQUAKES in the Light of the New Seismology, by Clarence Edward Dutton, New York, Putnam, 1904.

Reprinted by courtesy of G. P. Putnam's Sons, Publishers, New York and London.

WHEN the great earthquake comes, it comes quickly and is quickly gone. Its duration is generally a matter of seconds rather than of minutes, though instances have been in which it lasted from three to four minutes. Perhaps forty-five seconds would be a fair average. The first sensation is a confused murmuring sound of a strange and even weird character. Almost simultaneously loose objects begin to tremble and chatter. Sometimes, almost in an instant, sometimes more gradually, but always quickly, the sound becomes a roar, the chattering becomes a crashing. The rapid quiver grows into a rude, violent shaking of increasing amplitude. Everything beneath seems beaten with rapid blows of measureless power. Loose objects begin to fly about; those that are lightly hung break from their fastenings. The shaking increases in violence. The floor begins to heave and rock like a boat on the waves. The plastering falls, the walls crack, the chimneys go crashing down, everything moves, heaves, tosses. Huge waves seem to rush under the foundations with the swiftness of a gale. The swing now becomes longer and still more powerful. The walls crack open. A sudden lurch throws out the front wall into the street, or tears off or shakes down in rubble the whole corner of the building. Then comes a longer swaying motion, not like a ship at sea, but more rapid; not alone from side to side, but forward and backward as well, and both motions combined into a wriggle which it seems impossible for anything to withstand. It is this compound, figure-8 motion which is so destructive, rending asunder the strongest structures as if they were adobe. It is the culmination of the quake. It settles into a more regular

swing of decreasing amplitude, then suddenly abates and the motions cease.

Or suppose we are out in the country and the earthquake comes suddenly upon us. The first sensation is the sound. It is wholly unlike anything we have ever heard before unless we have already had a similar experience. It is a strange murmur. Some liken it to the sighing of pine trees in the wind, or the falling rain; others to the distant roar of the surf; others to the far-off rumble of the railway train; others to distant thunder. It grows louder. The earth begins to quiver, then to shake rudely. Soon the ground begins to heave. Then it is actually seen to be traversed by visible waves somewhat like the waves at sea, but of less height and moving much more swiftly. The sound becomes a roar. It is difficult to stand, and at length it becomes impossible to do so. The victim flings himself to the ground to avoid being dashed to it, or he clings to a convenient sapling, or fence-post, to avoid being overthrown. The trees are seen to sway sometimes through large arcs, and are said, doubtless with exaggeration, to touch the ground with their branches, first on one side, then on the other. As the waves rush past, the ground on the crests opens in cracks which close again in the troughs. As they close, the squeezed-out air blows out sand and gravel, and sometimes sand and water are spurted high in air. The roar becomes appalling. Through its din are heard loud, deep, solemn booms that seem like the voice of the Eternal One, speaking out of the depths of the universe. Suddenly this storm subsides, the earth comes speedily to rest and all is over.

And yet this feeble description suggests but a single instance, or a few instances having a general similarity. There are many variations of detail in the incidents of great earthquakes. In some the full vigour of the shock comes without any *crescendo*, but as a *sforzando*, with an almost explosive

suddenness. People find themselves suddenly thrown to the earth, the ground literally knocked from under their feet. Sometimes the rolling waves of soil are absent and the motion is a rude quiver, rapidly vibrating in every direction, twisting, contorting, wrenching the ground, as if in a determined effort to shake it into dust. Sometimes the most pronounced motion is vertical, as if the earth beneath were being hammered upward by a quick repetition of strokes. Sometimes the crescendo, climax, diminuendo are immediately repeated before the first cycle has come to complete rest, or it may be twice repeated. Or an interval of some minutes may elapse before the repetition, or even several hours. But a long-deferred repetition is very uncommon, though nearly all great earthquakes are followed by minor shocks for days, weeks, months, or even years afterward. Some of these are of considerable force though not of the devastating power of the principal shake. But they are alarming enough to keep people in a state of apprehension until they become inured to them. As time passes they diminish both in force and frequency and at length cease. . . .

Normal and Transverse Waves

Let us then conceive the interior of the earth as an indefinitely extended homogeneous solid. Imagine at the depth of a few miles below the surface a spherical cavity: that within this cavity a ball of dynamite is exploded. The suddenly expanding gases may be conceived as acting with equal force at all

Corn and Pumpkins

the most characteristically American plants of the Thanksgiving Season were "Turkish Corn" and "Turkish Cucumbers" to

DR. LEONHART FUCHS

who in
1542

published the first known pictures of these species, reproduced in the next

CLASSIC OF SCIENCE

points upon the spherical face of the cavity. The resultant direction of the forces at each point is radially outwards. Conceiving the surrounding mass as having a high degree of elasticity: every point of the surface will tend to move radially outward from the centre, imparting an outward thrust to points beyond, and propagating this thrust indefinitely. This purely ideal motion constitutes the method of movement in a "normal" wave. The vibration is to and from the centre of movement. It is the mode of vibration of sound-waves in air and water, as well as of normal waves in solids.

Elastic Resistance

Now let us change the conception. Imagine some force so applied as to tend to rotate the inner face of our cavity around a diameter as an axis. By the adhesion of the interior film to the surrounding mass this effect would be resisted in a solid, but not in a fluid. The resistance of the solid would be an elastic one. If the rotating or twisting force were withdrawn the elasticity of the material, after permitting a slight rotational displacement of the inner face of the cavity, would at once return to its original position. But in the meantime the rotating impulse would be imparted to more and more distant envelopes, indefinitely outwards, or as far as the medium might extend.

This ideal construction may give some notion of the kind of movement in a transverse wave. It is called transverse because the vibration of the particles is across a line extending outward from the origin. It can occur only in a solid, elastic medium, and is impossible in a liquid or gas. They are sometimes called waves of distortion, as they involve change of shape, or change in the relative positions of particles, without change of volume.

In the two foregoing suppositions the effort is to present in the first case the notion of a pure normal wave, and, in the second case, of the pure transverse wave. In nature the two, though they can be conceived of separately, can hardly be separately generated, and it may be said that an elastic wave in a solid is always compounded of normal and transverse vibrations at the origin, though they may separate afterwards. It is difficult and perhaps impossible to suggest any force actually occurring in nature and acting upon the rocks below the surface in such a way as to generate a pure normal wave or a pure transverse wave. Every force which can be sug-



WHAT AN EARTHQUAKE CAN DO

Since the earthquake disaster in Charleston, S. C., August 31, 1886, which Clarence Dutton investigated for the U. S. Geological Survey, many destructive tremors have been studied. The picture shows damage in one of the latest, Santa Barbara, 1925.

gested as at all liable to occur would create both normal and rotational displacements at the same time. A pure displacement of either kind can only be conceived of as a single or special case among an infinite number of possible ones.

That the normal and transverse waves should separate is due to the fact that their rates of propagation are different, that of the normal wave being the faster.* The speed of transmission of the normal wave is proportional to the square root of the ratio of volume-elasticity to density of the medium; that of the transverse wave is proportional to the square root of the ratio of the shape-elasticity (or rigidity) to the density. Volume-elasticity being greater than shape-elasticity, the speed of the normal wave is correspondingly greater.

...

Third Class of Vibrations

Thus far we have spoken only of certain ideal waves in an elastic solid. They are of two kinds and the two simplest kinds, viz.: the normal and the transverse. They are contemplated as expanding radially outwards from a central point or origin and propagating themselves through a medium which has no other limit than the surface of the earth. Recent progress of seismologic investigation has brought to light a third class of vibrations called surface waves,

which have awakened great interest among students of earth physics.

It may be questioned whether they are in reality a new discovery or anything else than a more definite and distinct recognition of a form of seismic motion which has always been imperfectly recognised as far back as the time of Thales and Aristotle, and only very recently brought into line with the most modern concepts of wave-motion. All writers ancient or modern seem to have been aware that seismic motion is vibratory and that there are vibrations of long periods and others of short periods. The ancient philosophers, Thales, Aristotle, Seneca, Pliny, Pausanias, seem to imply the idea that during an earthquake the ground moves in waves like the sea, while subject at the same time to sharp blows or shocks from beneath causing a "succussatory" or quick up-and-down motion superposed upon a slower undulatory movement. Thus Seneca says: "Duo genera sunt, ut Posidonio placet, quibus movetur terra. Utriusque nomen est proprium, altera succussio est, cum terra quatitur et sursum ac deorsum movetur, altera inclinatio, qua in latera, nutat navigii more." The notion that in an earthquake the ground undulates like the surface of the sea is surely very ancient and was deeply planted in the minds of the inhabitants of countries most subject to quakes, in Greece, the Aegean Archipelago, and southern Italy. It also became the foundation of the idea that the earth was composed of a crust floating upon a liquid.

*This separation of the two kinds of waves is only an inference from the general theory of wave-motion in elastic solids. It has never been directly observed, though long-distance observations strongly support the presumption.

The more detailed accounts of earthquakes in the literature of the nineteenth century had often recited the occurrence of a swinging motion like that which is felt on the deck of a ship, though less in amplitude. It was an invisible motion, but it was distinctly felt and sometimes caused nausea. At considerable distances from the epicentrum people in the upper stories of buildings felt a swinging motion, and the chandeliers or other freely suspended objects would swing, while no movement would be felt by those out of doors or upon the ground floor. This slow, swinging motion would be perceived when no other form of vibration was sensible. It was observable not only at great distances from the epicentrum but at intermediate points.

When the seismograph came into use in Japan the first records obtained from it showed that vibrations of short period, from a tenth to a quarter of a second, were usually superposed upon and simultaneous with vibrations of one or two seconds. The short vibrations were usually a little before the longer ones, but quickly died away, leaving the longer ones predominant and at length the exclusive form of oscillation. Thus was given a partial confirmation of the ancient idea as expressed by Seneca. The seismograph showed the long, swinging movement like the rocking of a ship and at the same time the quick tremors which, though not strictly a *successio*, were enough like it in their effects to be readily mistaken for it.

Science News Letter, November 21, 1931

ZOOLOGY

Bear with Bell Proud Although Ostracized

KNOWING that bears hate and fear noise, some packers on the trail in Glacier National Park this past season roped a black mother bear that had become too great a nuisance around their camp and hung a bell on a leather collar around her neck. She was then released.

The effect was amusing. Her cubs immediately ostracized her, squealing their displeasure. At first the mother bear resented the jingling neckpiece, then became accustomed to it, and finally actually displayed pride in it.

Her new cubs, if she retains the belled collar during the hibernating period, next summer probably will consider their mother a superior member of the bruin family because of her decoration.

Science News Letter, November 21, 1931

ENGINEERING

Research Hailed as Means To Save Railroad Lines

CONTINUED increase in efficiency of railroad operation as has been practiced during the past decade will be one of the chief methods by which the common carriers will extricate themselves from their present predicament. This thought is gathered from an address given by William C. Dickerman, president of the American Locomotive Company, before the Franklin Institute in Philadelphia.

Coming at a time when the railroads have been seeking higher freight rates, Mr. Dickerman's address emphasizes the great technical advances and economies the roads have made since 1920.

In spite of the fact that from 1920 to 1929 there was a reduction of 42 per cent. in the number of passenger-miles per year, this loss has been counteracted by savings and increased efficiencies, Mr. Dickerman pointed out. The loss of passenger-miles is not as serious as it at first seems because the bulk of the railroads' revenue is derived from freight, and freight revenue-ton-miles increased about ten per cent. during the decade.

Mr. Dickerman said that railroad operating costs in 1929 had been reduced to nearly three-fourths their 1920 value. The number of employees was reduced by 18 per cent., and 10 per cent. less coal was burned.

The concentration of trains into larger units and the expenditure of nearly \$7,200,000,000 for capital improvements taking advantage of technical advances are held responsible for these savings. The number of freight cars decreased during the ten-year period, but their average size and their total carrying capacity increased. There are also fewer locomotives by 7,000, but as a group they have greater power and higher speed, and make longer engine runs with less fuel than they did in 1920.

"This technical experience with its background of research, invention and resourcefulness," Mr. Dickerman said, "may be expected to continue its unrelaxed efforts towards greater efficiency, whether to be secured through superpressures in steam practice or in refinement of internal combustion power far

beyond anything that commercially has been developed to date."

Mr. Dickerman believes that the most immediate economies to be achieved by the railroads will come from replacing 25,000 locomotives more than 20 years old—nearly half the total number in the United States—with modern up-to-date efficient locomotives. Leaders in practically all fields have long recognized what obsolescence means to the progress of industry. They have not hesitated to replace their prime mover equipment as more efficient apparatus has been developed. Mr. Dickerman believes that the same economic analogy holds good in the field of railroad motive power.

Science News Letter, November 21, 1931

ZOOLOGY

Wild Boars of European Ancestry Roam in South

WILD BOARS, famous game animals of Europe in modern and mediæval times, exist today in certain mountainous regions of the South. Some thirty years ago their ancestors, believed to have been imported from Europe, were turned loose in the mountains immediately south of the Great Smokies.

The boars of today have the appearance and all the characteristics of the European boar, although it has been argued that they have crossed with the razor-back hog. In any case, however, the Tennessee boars are no less courageous or aggressive than their pure-blooded ancestors.

Science News Letter, November 21, 1931

MEDICINE

Adrenal Gland Operation Relieves Nervous Condition

AN OPERATION on the adrenal glands in which certain nerves are cut is successful in relieving the nervous condition known to scientists as neuro-circulatory asthenia, Dr. George Crile, of the Cleveland Clinic, has announced. This condition acquired the name of soldier's heart during the World War, when a number of officers and men at

the front became incapacitated by it. The same disease occurs in the stress of civilian life. The condition resembles mild hyperthyroidism, especially in cases in which there is a goiter, and is also sometimes confused with purely mental diseases such as psychoneuroses, psychoses, hysteria and maladjustments. These latter conditions, however, are not relieved by the operation, Dr. Crile reported.

The operation itself consists in severing certain nerves as they emerge from the adrenal glands. These small glands lying above the kidneys exert a powerful effect on the body. In emergencies, through a substance they secrete, they speed up our body processes so that we can act quickly and efficiently enough to save ourselves from whatever danger threatens. In the condition known as soldier's heart, the glands are overactive and cause stimulation which is not needed. After the operation, the feeling of nervous tension, rapid heart action and cold sweat which have accompanied the overstimulation become gradually less and less. The operation is performed in two stages. If improvement does not follow the first operation, Dr. Crile stated, it would be because the condition had been wrongly diagnosed. One patient has remained well for fourteen years after the operation on one side only, Dr. Crile reported.

Science News Letter, November 21, 1931

PHYSIOLOGY

Sensory Reactions of People Found to Be Widely Different

DIFFERENT people live in different worlds, so far as their sensory reactions are concerned, Dr. Albert F. Blakeslee of the Department of Genetics, Carnegie Institution of Washington, at Cold Spring Harbor, N. Y., told the meeting of the National Academy of Sciences at New Haven.

Dr. Blakeslee reported experiments testing the ability of different individuals to taste a chemical, phenyl-thio-carbamide. Some persons find very weak solutions of this substance extremely bitter; others detect no taste in even the crystals themselves. Taste deficiency for the crystals appears to be inherited as a Mendelian recessive, he has found.

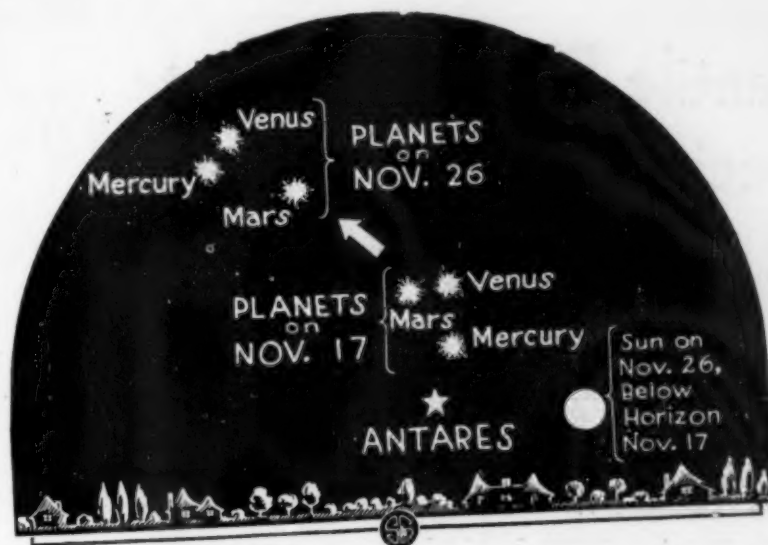
The inability to detect the bitterness is not a complete "taste blindness," as was at first supposed. For it has been

found by Dr. Blakeslee that the chemical is also bitter to the "non-tasters" if only it can be gotten to their sense organs in a sufficiently concentrated form.

"Most 'non-tasters' can detect bitterness if a cold saturated solution is used," Dr. Blakeslee told the scientists. "The few who are still negative to this test have been found to taste bitterness in a saturated solution in hot water or still better in hot weak alcohol."

Inability to taste the crystals may have something to do with differences in salivas as well as to differences in sense organs, Dr. Blakeslee believes. He found no close relation between acuteness of taste for this chemical and for another bitter compound—picric acid—or for a sweet or an acid.

Science News Letter, November 21, 1931



VENUS, MERCURY, AND MARS

Diagram of a portion of the western evening skies showing how close these three planets are to each other at present.

ASTRONOMY

Three Planets Together From November 17 to 26

WITH the combination of keen eyesight and a very clear sky in the west at sunset, an interesting conjunction of three bright planets can be seen between Tuesday, November 17, and Thanksgiving Day, November 26.

On the first date, just after the sun has descended behind the western horizon, the planet Venus can be seen a short distance above. Just to the left of it is the planet Mars, considerably fainter. Directly below Venus is Mercury, brighter than Mars, but inferior to Venus. The star Antares, in the constellation of Scorpius, is below Mercury, but is practically invisible.

Positions Change

On successive evenings the relative position of the planets changes. As they move through the sky to the east, Mercury will pass Mars and catch up with Venus. On November 26, Venus will be the highest, Mercury just below and to the left, and Mars several times as far below and to the right.

Unfortunately, these planets will be so close to the sun that they will set before the sky is very dark, but with slight optical aid, such as a pair of opera glasses, they may be seen more easily. After November 26, the sun will be so close that they will be invisible even with such assistance. A more satisfactory triple conjunction, of Saturn, Venus and Mercury, will be seen in 1935, from February 1 to 3.

Science News Letter, November 21, 1931

Statistical tables show that malaria has been increasing in the southern states in the past few years.

The U. S. Post Office Department is interested in a newly perfected device which weighs mail and records the amount of postage to be paid.

MEDICINE

Infantile Paralysis Selects Special Type of Children

Value of Convalescent Serum not Proved in Studies During Present Poliomyelitis Epidemic, Doctor Reports

INFANTILE paralysis, epidemic in New York and New England this summer and fall, affects more frequently children who are brunettes, have mongoloid eyes, deeply pigmented skin, wide faces with widely separated eyes, irregular teeth, and certain endocrine deficiencies, Dr. George Draper, professor of clinical medicine at Columbia University, has determined as a result of investigations made during the present prevalence of the disease.

"So far as the paralytic symptoms of poliomyelitis are concerned," Dr. Draper said, speaking at a conference in Albany, N. Y., sponsored by pediatricians of New York and Canada, "the child is more important than the virus of the disease itself."

Dr. Draper's demonstration of the influence of bodily constitution on susceptibility and severity of this dreaded illness may provide a means of selecting children who can be given special preventive attention during another epidemic.

Over 140,000 cubic centimeters of human convalescent serum were prepared and used for treatment during the epidemic in New York State, Dr. Thomas Parran, Jr., State Health Commissioner, reported. Twice that amount of human blood was collected to make the serum. Nearly 2,000 cases occurred in New York State outside of New York City where over 4,000 were reported.

Under the leadership of Dr. William H. Park, director of the New York City health department bureau of laboratories, every poliomyelitis case in the metropolis was visited by specialists drafted for the purpose. This special inquiry fails to show that in general the cases treated with convalescent serum progressed any better than those not so treated, although there was no evidence found that such serum injected intramuscularly did any harm. Dr. Lloyd W. Aycock, director of the Harvard Infantile Paralysis Commission, made carefully controlled clinical ex-

periments on the use of serum, giving serum only to every other case that came to the hospital, but he reported his results also were inconclusive.

Dr. Simon Flexner, director of the Rockefeller Institute of Medical Re-

PLANT PHYSIOLOGY

Instrument Indicates When Chicle Tree Should be Tapped

MAKING chicle trees, that yield the sap that becomes chewing gum, give a written notice when they should be tapped is the feat which has been accomplished by Dr. John Sidney Karling of Columbia University, during the course of his expedition and research in British Honduras and Central America. It was done with a dendrograph, which is a sort of steel corset that can be strapped around a tree, with a registering pen and a clockwork-driven drum to make a record of the trunk's contractions and expansions. The instrument is the invention of Dr. D. T. MacDougal of the Carnegie Institution of Washington.

The flow of latex or sap fluctuates widely during the day according to variations in the surrounding relative humidity, temperature, sunlight, rainfall, etc., and is closely correlated with a corresponding contraction and expansion of the stem. If the "chicleros" or tappers bleed the trunk when expanded the flow is quite high, but if they wait until it has contracted most of the sticky milk or sap remains in the tree.

It has been impossible to determine from ordinary observations when the stem reached its peak of expansion, and it occurred to Dr. Karling to apply the dendrograph to chicle trees in the jungle. It was found that the trunk expanded and contracted periodically during the day, and reached its maximum at six o'clock in the morning. He

search, New York, explained that the fact that the virus causing infantile paralysis cannot be seen does not mean that nothing is known about the disease. He suggested that the infection is introduced through the nose and that the victim must come into actual contact with someone carrying the disease. The nasal tract secretions are the most likely infective material.

Compared with 1916, when 21 out of each 100,000 died of the disease, this year's epidemic was mild, with only 8 deaths per 100,000. This may be due either to a milder form or a wider recognition of the disease by doctors.

Science News Letter, November 21, 1931

learned that he could predict the time of greatest flow accurately and get the maximum yield.

The work had its difficulties. Dr. Karling found it necessary to shelter the instrument from excessive rainfall by surrounding the tree trunk with a small thatched roof. This kept off the rain all right, but it also attracted small boa constrictors, which by crawling up and down the trunk often completely disarranged the recording needle and the graph.

Science News Letter, November 21, 1931

ENGINEERING

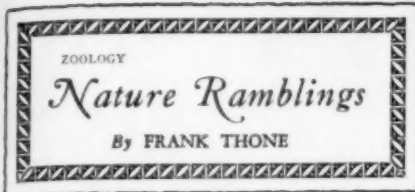
Airplanes Spot Breaks In Electric Power Lines

SKIMMING above the electric power lines of a public utility company in northern New York state, airplanes now do the patrol work formerly allotted to crews of men.

Many weary hours of walking and the services of numerous workers are saved through the use of an airplane, trial flights have shown. Even at a speed of one hundred miles per hour, the observer in a plane can spot failures along the line with the accuracy of a slow-moving ground crew.

Reports are transmitted by dropping notes or by telephone after the plane lands.

Science News Letter, November 21, 1931



Turkey

NEXT THURSDAY is Thanksgiving Day, the one feast-day that is found in the calendars of all American churches regardless of creed, and the one feast-day that is exclusively American.

The gastronomic features of the day, not less than the religious, are decidedly American also. Thanksgiving Day means "turkey and fixin's" in the typical American household, and the feast could easily be set forth with an all-American menu: turkey, white potatoes, sweet potatoes, corn-bread, tomatoes, Lima beans, cranberries, pumpkin pie. If one were willing to forego coffee, which comes from the Red Sea region, American chocolate could very well take its place.

The center of the table, of course, is held by the turkey, a noble bird whether you regard him as he struts at the head of his flock in all the bravery of his plumage, or browned and garnished on a platter. Why he has had to bear the name of an alien Oriental nation nobody has ever been able to explain satisfactorily.

The beautiful bronze turkeys that furnish the biggest specimens for the family festivities were domesticated before white men came to America. Cortez found them in the markets of Mexico, and showed that he was a gourmet as well as freebooter; for turkeys soon found their way to Spain and thence all over Europe, finally being re-introduced into American domestication in the English-speaking colonies, which had, however, already made the acquaintance of the smaller native wild turkey of their own forests.

So popular was the turkey with early Americans that Benjamin Franklin advocated placing it on the national coat of arms instead of the eagle, and there are still those among us who believe that his counsel should have prevailed.

Science News Letter, November 21, 1931

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• First Glances at New Books

Anatomy

SIMPLE LESSONS IN HUMAN ANATOMY—B. C. H. Harvey—*American Medical Association*, 434 p., \$2. This remarkably interesting and well illustrated book fills the long-felt need for a presentation of anatomical facts which would bridge the gap between the grade school physiology texts and the medical school anatomy texts. The style is distinguished for simplicity and clarity as well as interest. The book was elaborated from a series of articles which appeared in *Hygeia*, the health magazine published by the American Medical Association, and carries a foreword by Dr. Morris Fishbein.

Science News Letter, November 21, 1931

Chemistry

PHOTOCHEMISTRY—D. W. G. Style—*Dutton*, 96 p., \$1.10. A brief, technical presentation of the subject as one of a series of physical monographs edited by Dr. B. L. Worsnop, King's College, London.

Science News Letter, November 21, 1931

Mammalogy

REPORT OF THE AMERICAN BISON SOCIETY, 1927-28-29-30—*American Bison Society*, 69 p. Outstanding features are a tribute to the late Stephen T. Mather, a detailed census, by states and countries, of American bison now living, and a discussion of the present status of the wisent. The report, however, does not confine itself entirely to the two species of bison, but presents significant data on other hoofed mammals as well.

Science News Letter, November 21, 1931

Psychology

PSYCHOLOGY: SCIENCE OR SUPERSTITION?—Grace Adams—*Covici, Friede*, 299 p., \$2.50. You may not agree with the author that "there is no logical necessity for our accepting a single hypothesis of even the greatest of modern psychologists," but at least you will find interesting her witty, frank, and confident statements regarding both the older and the present-day psychologists and psychologies.

Science News Letter, November 21, 1931

Entomology

RECENT ADVANCES IN ENTOMOLOGY—A. D. Imms—*Blakiston*, 374 p., \$3.50. This book, as its title indicates, is not an attempt at presenting all facts about insects, but contents itself with

summing up some of the more important additions to the knowledge in entomology within the past couple of decades. The rapidly developing sub-discipline of palaentology, new things in insect morphology and physiology, and the complex subject of insect ecology, both of free-living forms and of parasites, are among the topics considered.

Science News Letter, November 21, 1931

Physics

RADIO FREQUENCY ELECTRICAL MEASUREMENTS—Hugh A. Brown—*McGraw-Hill*, 386 p., \$4.00. An excellent advanced text for students in the fourth year of a college curriculum in electrical engineering. This is not an ordinary "cook-book" laboratory manual. The theory and fundamental principles of each type of measurement (of which there are so many) is first discussed clearly and in detail. A brief description of the laboratory procedure follows but there is no attempt to encourage intellectual parasitism in the student by doing all the thinking for him. A knowledge of alternating current phenomena and of the principles of radio communication is assumed.

Science News Letter, November 21, 1931

Herpetology

SNAKES OF THE WORLD—Raymond L. Ditmars—*Macmillan*, 207 p., 84 pl., \$6. When Dr. Ditmars gets out anything on a reptilian subject, zoologists are justified in sitting up and taking notice. This book is no exception. It is sufficiently scientific in its place on the laboratory or museum bookshelf, crisply readable enough to hold the attention even of the person who "doesn't like snakes"; and the photographic plates are simply superb.

Science News Letter, November 21, 1931

Medicine

THE LUNGS AND THE EARLY STAGES OF TUBERCULOSIS—Lawtason Brown and Fred H. Heise—*Appleton*, 151 p., \$1.50. This latest of the Appleton popular health series is a simple, straightforward presentation of the subject by two authorities on tuberculosis. Since prevention of the disease is emphasized, it is a book which can profitably be read by everyone, and it is particularly recommended to parents who wish to learn how to protect their children from this disease.

Science News Letter, November 21, 1931

Travel

A NATURALIST IN BRAZIL—Konrad Guenther, trans. by Bernard Miall—*Houghton Mifflin*, 400 p., \$5. Most books of travel, produced by globetrotters with an itch to write, are ephemera; but when a trained observer records the sights and experiences of his journey, enriching it with informative sidelights on a thousand things that most of us pass without even looking at, he is very apt to produce something of value as a permanent addition to the bookshelf. To this genus the present book belongs. And the translator has done the author adequate justice.

Science News Letter, November 21, 1931

General Science

A TEST TO ACCOMPANY "A GENERAL SCIENCE WORKBOOK"—Charles H. Lake, Louise E. Welton, and James C. Adell—*Silver, Burdett*, 16 Units, \$1.80 per pkg. of 10. A series of objective questions based on the text.

Science News Letter, November 21, 1931

Horticulture

THE MODERN NURSERY—Alex Laurie and L. C. Chadwick—*Macmillan*, 494 p., \$5. Quite emphatically a book for the man who intends to make a business—a paying business—out of his nursery. The first two chapters are devoted to highly practical economics, followed by location and layout, tools, soils, fertilizer, propagation, handling and marketing and a concluding chapter on nursery laws, quarantines and plant patents.

Science News Letter, November 21, 1931

Home Economics

OUR CLOTHING—Josephine Worthington and Catherine Victoria Matthews—*Owen*, 256 p., 96c. This is an extremely interesting, well illustrated book for children of primary and intermediate grade age. It is not written as a text book and should be popular.

Science News Letter, November 21, 1931

Archaeology

ARCHAEOLOGICAL SURVEY OF EASTERN COLORADO—E. B. Renaud—*Univ. of Denver*, 102 p. In this first systematic survey of eastern Colorado, Dr. Renaud and his associates have explored 28 counties and found only three barren of Indian remains. The report describes camp sites, stone enclosures, stone implements, rock pictures, and pottery found on the expedition.

Science News Letter, November 21, 1931